CLAIMS

1. A method of reduction treatment of metal oxides characterized by using as a feed material a powder containing metal oxides and containing alkali metals and halogen elements, mixing said feed material with water to produce a slurry, then dehydrating this and charging the dehydrated material into a rotary hearth type reduction furnace for reduction.

2. A method of reduction treatment of metal oxides characterized by using as a feed material a powder containing metal oxides and containing alkali metals and halogen elements, mixing said feed material with water to produce a slurry, then dehydrating this, mixing the dehydrated material with another feed material, and charging said mixture into a rotary hearth type reduction furnace for reduction.

3. A method of reduction treatment of metal oxides characterized by using as a feed material a mixed powder of a powder containing metal oxides and containing alkali metals and halogen elements and a powder containing carbon, mixing said feed material with water to produce a slurry, then dehydrating this, and charging said dehydrated material into a rotary hearth type reduction furnace for reduction.

4. A method of reduction treatment of metal oxides characterized by using as a feed material a mixed powder of a powder containing metal oxides and containing alkali metals and halogen elements and a powder containing carbon, mixing said feed material with water to produce a slurry, then dehydrating this, mixing the dehydrated material with another feed material, and charging said mixture into a rotary hearth type reduction furnace for reduction.

5. A method of reduction treatment of metal oxides as set forth in any one of claims 1 to 4, characterized in that said powder contains a total of at least 0.1 mass% of alkali metals and halogen elements.

6. A method of reduction treatment of metal oxides as set forth in any one of claims 1 to 5, characterized in that a mass ratio of powder and water in said slurry is at least 1:1.5 and a mass ratio of powder and water in said dehydrated material is not more than 1:0.4.

7. A method of reduction treatment of metal oxides as set forth in any one of claims 1 to 6, characterized by heating and agitating the slurry at 80°C or less in the production of said slurry.

8. A method of reduction treatment of metal oxides as set forth in any one of claims 1, 2, and 5 to 7, characterized by using as said feed material a powder containing both iron oxide and zinc oxide and/or lead oxide and containing alkali metals and halogen elements in a ratio alkali/(zinc+lead) between a total of the number of moles of alkali salts and a total of the number of moles of lead of at least 0.1.

9. A method of reduction treatment of metal oxides as set forth in any one of claims 3, 4, and 5 to 7 characterized by using as said feed material a powder comprised of a mixture of a powder containing both iron oxide and zinc oxide and/or lead oxide and a powder containing carbon and containing alkali metals and halogen elements in a ratio alkali/(zinc+lead) between a total of the number of moles of alkali salts and a total of the number of moles of lead of at least 0.1.

10. A method of reduction treatment of metal oxides as set forth in claim 8, characterized in that a pH of a slurry produced by mixing said powder with water is 7 to 11.5.

11. A method of reduction treatment of metal oxides as set forth in claim 9, characterized in that a pH of a slurry produced by mixing said mixed powder with water is 7 to 11.5.

12. A method of reduction treatment of metal oxides as set forth in any one of claims 1 to 11, characterized by shaping said dehydrated material into moist shaped

articles having a porosity of at least 35% and charging said shaped articles into a rotary hearth type reduction furnace for reduction without drying.

13. A method of reduction treatment of metal oxides as set forth in claim 12, characterized by making a mass ratio of powder and water in said dehydrated material 1:0.2 to 1:0.4 and shaping said dehydrated material into moist shaped articles having an average volume of not more than 10000 mm^3.

14. A method of reduction treatment of metal oxides as set forth in claim 13, characterized by making a molar ratio of oxygen and carbon contained in said shaped articles 1:0.6 to 1:1.5, charging said shaped articles into a rotary hearth type reduction furnace, and reducing them by leaving them for at least 8 minutes at the part of the furnace having a gas temperature or 1200°C or more.

15. A method of reduction treatment of metal oxides as set forth in any one of claims 1 to 14, characterized in that said rotary hearth type reduction furnace is provided with an exhaust gas treatment facility having at least one of a waste heat boiler and an air preheater.

16. A method of reduction treatment of metal oxides as set forth in any one of claims 1 to 15, characterized in that said powder is steelmaking waste.

17. A method of concentrating and recovering zinc and/or lead characterized by recovering dust in exhaust gas produced in the method of reduction treatment of metal oxides described in any of claims 1 to 16 as feed material for zinc and/or lead.

18. A method of reduction treatment of steelmaking waste characterized by:

mixing by agitation steelmaking waste, a pH adjuster, and a carbon-bearing material in water, then concentrating the mixture to produce a slurry,

pressing said slurry to dehydrate it,

extruding said dehydrated material to shape it into shaped articles,

charging said shaped articles into a moving hearth type reduction furnace for reduction and recovering the secondary dust containing zinc oxide produced.

19. A method of reduction treatment of steelmaking waste characterized by:

stirring and mixing steelmaking waste and a pH adjuster in water, then concentrating the mixture to produce a slurry,

pressing said slurry to dehydrate it,

adding and kneading a carbon-bearing material into said dehydrated material,

extruding said dehydrated material to shape it into shaped articles,

charging said shaped articles into a moving hearth type reduction furnace for reduction and recovering the secondary dust containing zinc oxide produced.

20. A method of reduction treatment of steelmaking waste as set forth in claim 18 or 19 characterized in that said pH adjuster is a substance containing OH- groups.

21. A method of reduction treatment of steelmaking waste as set forth in any one of claims 18 to 20 characterized in that said pH adjuster is fly ash discharged from a refuse melting furnace or incinerator furnace.

22. A method of reduction treatment of steelmaking waste as set forth in any one of claims 18 to 21 characterized in that a pH of the slurry adjusted in pH by said pH adjuster is at least 8.

23. A method of reduction treatment of steelmaking waste as set forth in any one of claims 18 to 22 characterized in that said dehydrated material contains moisture in an amount of 16 to 27 mass% of said dehydrated material.

24. A system for reduction treatment of steelmaking

waste characterized by being provided with:

an agitation tank for mixing by agitation steelmaking waste, a pH adjuster, and a carbon-bearing material in water,

a concentration tank for concentrating the agitated mixture to produce a slurry,

a dehydrator for pressing the slurry poured on endlessly moving filter cloth by at least one pair of rolls arranged above and below the cloth so as to dehydrate it,

a molding machine for extruding said dehydrated material from a die to shape it,

a moving hearth type reduction furnace for reducing said shaped articles, and

a dust collector for recovering the secondary dust containing zinc oxide produced in said moving hearth type reduction furnace.

25. A system for reduction treatment of steelmaking waste characterized by being provided with:

an agitation tank for mixing by agitation steelmaking waste and a pH adjuster in water,

a concentration tank for concentrating the agitated mixture to produce a slurry,

a dehydrator for pressing the slurry poured on endlessly moving filter cloth by at least one pair of rolls arranged above and below the cloth so as to dehydrate it,

a kneader for adding and kneading a carbon-bearing material to said dehydrated material,

a molding machine for extruding said dehydrated material from a dies to shape it,

a moving hearth type reduction furnace for reducing said shaped articles, and

a dust collector for recovering the secondary dust containing zinc oxide produced in said moving hearth type reduction furnace.